Distortions of Mind Perception in Psychopathology

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Abstract

It has long been known that psychopathology can influence social perception, but a novel two-dimensional framework of mind perception provides the opportunity for a new understanding of some disorders. We examined the covariation of mind perception with 3 subclinical syndromes—autism-spectrum disorder, schizotypy, and psychopathy—and found that each presents a unique mind perception profile. Autism-spectrum disorder involves reduced perception of agency in adult humans. Schizotypy involves increased perception of both agency and experience in entities generally thought to lack minds. Psychopathy involves reduced perception of experience in adult humans, children, and animals. Disorders are differentially linked with the over- or under-perception of agency and experience in a way that helps explain their real-world consequences.

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Mental disorders can reveal themselves in distortions of social perception. A person with a disorder may have difficulty understanding the goals of others, or in more profound cases, may ascribe life to inanimate objects or entirely fail to recognize mental states at all. Such distorted mind perception not only has consequences for sufferers of disorders and society at large, but may also help in understanding the etiology, diagnosis and treatment of psychopathology. In this research, we examine three subclinical syndromes associated with interpersonal difficulties: autism-spectrum disorder, schizotypy, and psychopathy. We predicted that each would be characterized by a unique pattern of distorted mind perception.

Traditional approaches to psychopathology often treat individual disorders as separate entities, each with its own signs, symptoms and etiology. While this approach has made significant progress in defining and treating psychopathology, this compartmentalization of disorders belies the integrated nature of the mind. More recent research takes a "transdiagnostic" approach, characterizing separate disorders as different impairments of underlying cognitive systems (1). For example, depression, anxiety and substance abuse all appear to be linked to disturbances of affect (2). We suggest that a number of disorders may be characterized as specific distortions of mind perception – atypical ascriptions of mental capacities to other entities.

Successful interaction with the world requires knowing which entities have minds and which do not. Mind perception can therefore be distorted by over-perception (perceiving a non-existent mind), and under-perception (failing to perceive an existent mind). Research suggests that both can be associated with adverse consequences for perceivers and targets--consequences that range from social faux pas to violence and death. For instance, the over-perception of mind

in infants can lead to child abuse (3), while the under-perception of mind in adults can lead to the denial of moral rights (4; 5).

While psychopathology has long been linked to abnormal social perception, recent discoveries provide a novel framework for understanding the link between mental disorders and mind perception. Originally thought to proceed along a single dimension, mind perception has been revealed in a factor-analytic study to occur along independent dimensions of experience (e.g., the capacity for pleasure, fear, hunger) and agency (e.g., the capacity for self-control, planning, memory) (6). Adult humans are typically seen as capable of both experience and agency, whereas children and animals are seen as capable of mainly experience. Gods and robots are seen as capable of mainly agency, while the dead are seen as capable of neither.

These dimensions capture a range of research on both mind perception and morality (7), and similar dimensions surface in studies of stereotyping (8) and the perception of humanness (4). This two-dimensional structure allows for a nuanced understanding of mind perception as it relates to psychopathology, as different disorders may be characterized by the under- or over-ascription of experience, agency, or both. Furthermore, psychopathologies may be linked to under and over perception of agency or experience only for certain targets, providing a multi-dimensional space for understanding psychopathology. We investigate the link between perceptions of mind and three disorders that have been linked to abnormal social function.

Autism spectrum. The autism spectrum is a clear candidate for distorted mind perception. Previous research finds that those on the autism spectrum have difficulty representing others' mental states (9), however, the precise nature of this difficulty is not fully characterized. Autism is consistently linked with failures to understand others' goals and plans (i.e., their agentic mental contents; 10; 11), but there is significant debate about ascriptions of experience. Some

studies find deficits in processing others' emotional states (12), while others find that individuals with autism use emotion-related words similar to matched controls (13) and remain sensitive to the emotional discomfort of others (14). Moreover, although individuals with autism often have difficulty interacting with other people, they interact relatively easily with non-human animals (15) and robots (16). This would suggest that while the perception of human minds may be impaired, scores on the autism spectrum should be unrelated to the mind ascribed to other entities.

Schizotypy. Research has suggested that schizotypy may be opposite to autism in the domain of social cognition, involving the over-attribution of mental states (17). Such promiscuous mind perception may underlie schizotypals' strange beliefs, magical thinking and paranoia. While adult humans are typically ascribed maximum amounts of both agency and experience – creating a ceiling effect that precludes over-attributions – non-human targets should be ascribed relatively more mind by those higher in schizotypy.

Psychopathy. Psychopathy is characterized by callous affect and interpersonal insensitivity; psychopaths are perhaps best known for manipulating others and committing crimes (18). The cause of their frequently cruel behavior is debated, but one prominent theory suggests that psychopaths lack the ability to empathize with others (19; 20). As empathy requires an understanding of another's emotional states (21), we hypothesized that those high in psychopathic tendencies would fail to perceive experience in those who normally possess this capacity (i.e., humans and animals). Importantly, as experience is linked to the ascription of moral rights (5; 6), its denial would help explain why psychopaths harm both people and animals (22).

Method

Participants were 890 online survey respondents ranging in age from 18 to 73 (M = 32). Sixty percent were women, and the majority had some college education. Forty-five participants were excluded from analysis for failing to complete the survey or for failing catch items (see supporting information). Participants were solicited from internet advertising and undergraduate classes to complete the *Mind Survey*, where they judged the perceived experience and agency of nine target entities (Figure 1; see supporting information). They also completed web versions of the *Autism-spectrum Quotient* scale (AQ) (9), the *Schizotypy Personality Questionnaire* (SPQ-B) (23), and the *Self-Report Psychopathy Scale* (SPR-III) (24). Because of confidentiality concerns, the "Criminal Behavior" subscale of the SPR-III was not included, and because of the strong association between the SPQ-B "Interpersonal" and "Disordered" subscales and the AQ, rs(843) > .43, ps < .001, we exclusively examined Cognitive-Perceptual schizotypy.

A confirmatory factor analysis supported dividing mind perception into Agency and Experience, χ^2 = 546.53, p < .00001 (see supporting information). Links between mind perception and psychopathology were investigated by correlating ratings of Agency and Experience with the three subclinical psychopathology indices. To control for multiple comparisons and the large sample size, only unadjusted correlations above |r = .1| were deemed significant (all dfs = 843, all ps < .001). See Figure 1. See supporting information for the complete correlation matrix.

In order to account for the possible influence of other variables, we examined the link between mind perception and gender, age and education. Age and education had little effect on mind perception, with the only significant finding being that increased age and education were linked to decreased mind ascription to Superman, A|r (correlation with Agency) = -.21; E|r

(correlation with experience) = -.25. With respect to gender, women ascribed more experience to adult humans, E|r = .12, animals, E|r = .18, and babies, E|r = .18 than men did, potentially stemming from women possessing greater trait empathy (25). Additionally, women ascribed increased agency to God, A|r = .14, which is consistent with the relatively higher religiosity of women (26). Reported correlations are adjusted for gender where appropriate.

Results and Discussion

Autism spectrum. We found that higher scores on the Autism-spectrum Quotient scale were associated specifically with reduced perceptions of agency in adult humans, A|r = -.14. This observation suggests that the deficits of autism lie primarily with understanding others' goals and plans. The lack of association between autism spectrum scores and attributions of experience, E|r = -.03, suggests that individuals with autism can still empathize with other people. Finally, the lack of distortion in the perception of animals, A|r = -.02; E|r = -.05, and robots, A|r = -.006; E|r = -.05, is consistent with reports that some people with autism form bonds with these entities despite being disconnected from people (15; 16). Controlling for gender leaves the link between autism spectrum scores and ascription of agency to adult humans largely unchanged, A|r = -.13, an interesting finding given that autism spectrum scores are generally higher for men (9), as indeed they were in this sample, r = .14, p < .001.

Schizotypy. Results confirmed that those higher in schizotypy were primarily characterized by a tendency to indiscriminately perceive mind—that is, to perceive mental capacities where other people typically do not. Whereas ascriptions of mental capacities to human adults were normal for those higher in schizotypy, these individuals ascribed greater experience, agency, or both to entities generally perceived to lack mental capacities: trees, A|r = .19; E|r = .22, dead people, A|r = .17; E|r = .16, robots, A|r = .12, and animals, A|r = .20. Higher

schizotypy scores were also associated with increased attributions of mind to God, A|r = .15, E|r = .13. Controlling for gender made no difference; there was no apparent relation between gender and schizotypy, r = .04, *ns*.

Psychopathy. Consistent with our hypothesis, higher psychopathy scores were associated with reduced perceptions of experience to those typically ascribed experience. Adult humans, E|r = -.12, babies, E|r = -.15, and animals, E|r = -.14, were all afforded less experience. This may account for why psychopaths harm these groups – without perceptions of experience, the ascription of moral rights also diminishes (4; 7). Additional regression analyses controlling for gender found that psychopathy remained significantly related to reduced experience ascription, albeit with reduced magnitudes: adult humans, E|β = -.09, babies, E|r = -.09, and animals E|r = -.08, all ts > 2.2, all ps < .03. This reduction of effect size likely stems from the link between gender and psychopathy, with males scoring relatively higher – measured in this sample at r = .36, p < .001. Other significant psychopathy correlations were decreased ascriptions of agency to adult humans A|r = -.22, and increased perceptions of mind in Superman, A|r = .13; E|r = .13. The Superman finding is curious – perhaps psychopaths identify with this invincible hero.

General Discussion

Autism spectrum disorders, schizotypy, and psychopathy each involve abnormalities in social interaction, but analyzing these disorders in terms of ascriptions of agency and experience across a range of targets shows that each has a unique pattern of distorted mind perception. It is worth noting that these findings stem from self-report measures, and that the correlations reported are relatively modest, despite their strong statistical significance. Even small correlations, however, can translate to large effects when considering the extremes of distributions (i.e., those who qualify for clinical diagnoses). Mind perception in clinical

populations may be even more distorted if the link between psychopathology and mind perception is non-linear. Quadratic models designed to explore this possibility did not reveal any systematic non-linearity, but our study included only a limited number of individuals who surpass the clinical cutoff for each disorder. Future research using clinical samples could test directly for such effects.

The results of this study help to characterize three disorders and highlight the benefits of a transdiagnostic approach (1; 2), whereby disorders are viewed as disturbances of underlying cognitive systems. The findings suggest that mind perception is one such cognitive system that would benefit from future research as it relates to psychopathology. Such research could assist with etiology and treatment, for instance, investigating whether adjusting mind perception also improves other symptoms of these disorders. Most of all, these results suggest that the characterization of psychopathology should focus not only on minds of sufferers, but also on how their minds perceive those of others.

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References

1. Harvey A, Watkins E, Mansell W, Shafran R. Cognitive Behavioural Processes across Psychological Disorders: A Transdiagnostic Approach to Research and Treatment. 1st ed. New York: Oxford University Press; 2004.

2. Kring AM. Emotional disturbances as transdiagnostic processes. In: Lewis, M, Haviland-Jones JM, Barrett LF, editors. Handbook of Emotions. New York: Guildford Press; [date unknown]

3. Perez-Albeniz A, De Paul J. Empathy and risk status for child physical abuse: The effects of an adult victim's pain cues and an adult victim's intent on aggression. Aggressive Behavior 2006 Oct;32(5):421-432.

4. Haslam N. Dehumanization: An integrative review. Personality and Social Psychology Review 2006 Aug;10(3):252-264.

5. Gray K, Wegner DM. Moral typecasting: Divergent perceptions of moral agents and moral patients. J Pers Soc Psychol 2009 Mar;96(3):505-520.

6. Gray HM, Gray K, Wegner DM. Dimensions of mind perception. Science 2007 Feb;315(5812):619.

7. Waytz A, Gray K, Epley N, Wegner DM. Causes and consequences of mind perception. Trends in Cognitive Sciences 2010;14:383-388.

8. Fiske ST, Cuddy AJC, Glick P. Universal dimensions of social cognition: Warmth and competence. Trends in Cognitive Sciences 2007 Feb;11(2):77-83.

9. Baron-Cohen S, Wheelwright S, Skinner R, Martin J, Clubley E. The Autism-spectrum quotient (AQ): Evidence from asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. Journal of Autism and Developmental Disorders 2001 Feb;31(1):5-17.

10. Baron-Cohen S. Mindblindness. Cambridge, MA: MIT Press; [date unknown].

11. Leslie AM, Thaiss L. Domain specificity in conceptual development: Neuropsychological evidence from autism. Cognition 1992 Jun;43(3):225-251.

12. Dapretto M, Davies MS, Pfeifer JH, Scott AA, Sigman M, Bookheimer SY, Iacoboni M. Understanding emotions in others: mirror neuron dysfunction in children with autism spectrum disorders. Nat Neurosci 2006 Jan;9(1):28-30.

13. Tager-Flusberg H. Autistic children's talk about psychological states: deficits in the early acquisition of a theory of mind. Child Dev 1992 Feb;63(1):161-172.

14. Rogers K, Dziobek I, Hassenstab J, Wolf OT, Convit A. Who cares? Revisiting empathy in asperger syndrome. J Autism Dev Disord 2006;37(4):709-715.

15. Pavlides M. Animal-assisted Interventions for Individuals with Autism. Philadelphia, PA: Jessica Kingsley Publishers; 2008.

16. Robins B, Dautenhahn K, Dickerson P. From isolation to communication: A case study evaluation of robot assisted play for children with Autism with a minimally expressive humanoid robot. In: Advances in Computer-Human Interactions, 2009. ACHI '09. Second International Conferences on. 2009 p. 205-211.

17. Crespi B, Badcock C. Psychosis and autism as diametrical disorders of the social brain. Behavioral and Brain Sciences 2008;31(03):241-261.

18. Hare RD. Psychopathy as a risk factor for violence. Psychiatr Q 1999;70(3):181-197.

19. Blair RJR. The amygdala and ventromedial prefrontal cortex in morality and psychopathy. Trends Cogn. Sci. (Regul. Ed.) 2007 Sep;11(9):387-392.

20. Marsh AA, Blair R. Deficits in facial affect recognition among antisocial populations: A meta-analysis. Neuroscience & Biobehavioral Reviews 2008;32(3):454-465.

21. Preston SD, de Waal FBM. Empathy: Its ultimate and proximate bases. Behavioral and Brain Sciences 2001;25(01):1-20.

22. Hare RD. Without Conscience: The Disturbing World of the Psychopaths Among Us. New York: Guilford Press; 1998.

23. Raine A, Benishay D. The SPQ-B : A brief screening instrument for schizotypal personality disorder. Journal of Personality Disorders 1995;9(4):346-355.

24. Paulhus DL, Hemphill J, Hare R. Manual of the Self-report psychopathy scale (SRP-III). Toronto: Multi-Health Systems; 2009.

25. Baron-Cohen S, Wheelwright S. The empathy quotient: An investigation of adults with asperger syndrome or high functioning autism, and normal sex differences. J Autism Dev Disord 2004;34(2):163-175.

26. Vaus DD, McAllister I. Gender differences in religion: A test of the structural location theory. American Sociological Review 1987 Aug;52(4):472-481.

Figure Caption

Figure 1. Targets located by agency and experience factor scores. Vectors represent significant correlations between mind perception and increased severity of disorder (color coded). Horizontal vectors represent variation on agency, while vertical vectors represent variation on experience. Diagonal vectors represent variation on both agency and experience. For example, those with higher Autism quotients ascribe less agency to adult humans (r = -.14). Vectors are scaled to represent magnitude of correlation.